

West Colorado Watershed Management Unit Water Quality Assessment Report



**Division of Water Quality
Department of Environmental Quality**

West Colorado Watershed Management Water Quality Assessment Report

**December
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**Department of Environmental Quality
Division of Water Quality
Salt Lake City, Utah**

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EXECUTIVE SUMMARY

In July of 1997, the Division of Water Quality (DWQ) began an intensive water quality monitoring project to assess the quality of waters in the south-central part of Utah. This area was designated by the Division as the West Colorado Watershed Management Unit. Samples were collected from 48 sampling sites were used to assess the water quality of streams in the management unit. Forty-one sites were monitored by the Utah Division of Water Quality (DWQ) on an intensive basis from July 1997 through June 1998. Samples were collected once a month except during spring runoff in 1998. Samples were collected twice a month during this time. No samples were collected in December. In addition, data collected at 5 streams sites during lake assessment monitoring were used to assess streams. The U.S. Bureau of Land Management collected samples at 2 stream sites independent from the intensive survey. They also collected additional data at two sites on the Escalante River. Canyonlands National Park personnel collected the samples at the Green River confluence with the Colorado River.

Streams were assessed against State water quality standards and pollution indicators to determine if their designated beneficial uses were being met. The streams in the Southeast Watershed Management Unit are classified as one of the following or a combination of the following beneficial use classifications: protected as a source of drinking water (1C), contact recreation (2B), cold water game fish (3A), warm water game fish (3B), non-game fish and other aquatic life (3C), and agricultural use including irrigation and stock watering (4).

There are an estimated 2,551 perennial stream miles within the West Colorado Watershed Management Unit. An assessment of support of all beneficial uses except Class 2B (contact recreation) was made for 1,986 miles (77.9%). Of those assessed, 1,430 miles (77.9%) were assessed as fully supporting all their beneficial uses, 143 miles (7.2%) were assessed as partially supporting, 413 miles (20.8%) were assessed as not supporting at least one designated beneficial use. The table below lists beneficial use support under the individual beneficial use designations.

Individual Beneficial Use Support Summary West Colorado Watershed Management Unit (Stream Miles)							
Goals ^a	Use	Size Assessed	Size Fully Supporting	Size Fully Supporting but Threatened	Size Partially Supporting	Size Not Supporting	Size Not Attainable
Protect & Enhance Ecosystems	Aquatic Life	1,986.2	1,935.0	0.0	26.7	24.5	0.0
Protect & Enhance Public Health	Fish Consumption	0.0	0.0	0.0	0.0	0.0	0.0
	Swimming ^b	0.0	0.0	0.0	0.0	0.0	0.0
	Secondary Contact	0.0	0.0	0.0	0.0	0.0	0.0
	Drinking Water ^c	649.9	649.9	0.0	0.0	0.0	0.0

Individual Beneficial Use Support Summary West Colorado Watershed Management Unit (Stream Miles)							
Goals^a	Use	Size Assessed	Size Fully Supporting	Size Fully Supporting but Threatened	Size Partially Supporting	Size Not Supporting	Size Not Attainable
Social and Economic	Agricultural	1,793.5	1,262.3	0.0	118.2	413.0	0.0

^a These goals are part of the national water quality goals adopted by the EPA Office of Water and the ITFM in their Environmental Goals and Indicators effort.

^b Class 2B (secondary contact) streams were evaluated as swimmable for purposes of the CWA goals, therefore the swimming and secondary contact classification categories are the same.

Some of the major streams are the Price River, Huntington Creek, Cottonwood Creek, Ferron Creek, San Rafael River, Escalante River, Muddy Creek, Dirty Devil River, the Fremont River, and portions of the Green and Colorado Rivers.

The major cause of water quality impairment was total dissolved solids (TDS) that exceeded the State's agricultural (Class 4) standard of 1,200 mg/l. The probable sources for TDS were natural and agricultural practices that tend to increase the amount of TDS in streams in this area. Other causes of stream impairment were total phosphorus, pH, dissolved oxygen, and iron.

West Colorado Watershed Management Unit Stream Water Quality Assessment

Introduction

The West Colorado Watershed Management Unit includes all streams located in the U.S.G.S. Hydrological Units (HUCs) listed in Table 1. Some of the major streams are the Price River, Huntington Creek, Cottonwood Creek, Ferron Creek, San Rafael River, Escalante River, Muddy Creek, Dirty Devil River, the Fremont River, and portions of the Green and Colorado Rivers.

Table 1. Hydrological Unit Codes and Names	
Hydrological Unit Code	Hydrological Unit Name
14060007	Price
14060008	Lower Green
14060009	San Rafael
14070001	Upper Lake Powell
14070002	Muddy
14070003	Fremont
14070004	Dirty Devil
14070005	Escalante
14070006	Lower Lake Powell

Materials and Methods

Field and Laboratory Methods—Data collected from 48 sampling sites were used to assess the water quality of streams in the management unit. Forty-one sites were monitored by the Utah Division of Water Quality (DWQ) on an intensive basis from July 1997 through June 1998. Samples were collected once a month except during spring runoff in 1998. Samples were collected twice a month during this time. No samples were collected in December. In addition, data collected at 5 streams sites during lake assessment monitoring were used to assess streams. In addition, data collected at 5 streams sites during lake assessment monitoring were used to assess streams. The U.S. Bureau of Land

Management collected samples at 2 stream sites independent from the intensive survey. They also collected additional data at two sites on the Escalante River. Canyonlands National Park personnel collected the samples at the Green River confluence with the Colorado River. The samples were processed by the State Health Laboratory.

For the intensive monitoring, oxygen, pH, water temperature, and conductivity were measured *in situ* using a Hydrolab. Instantaneous flows were measured using a Marsh-McBurney flow meter during each survey unless the station was located at or near a U.S. Geological Survey (U.S.G.S.) gaging station. Flow data for these stations will be obtained when the U.S.G.S. publishes it. Water quality samples were collected according to standard field procedures defined and adopted by the Division of Water Quality in 1993 (DWQ, 1993). Chemical analysis in the laboratory included ammonia, total phosphorus, dissolved nitrate-nitrite, dissolved total phosphorus, total suspended solids, total dissolved solids, dissolved calcium, dissolved magnesium, dissolved potassium, dissolved sodium chloride concentration, sulfate, alkalinity and hardness. Turbidity was also determined in the laboratory. Concentrations for the following dissolved metals were determined: arsenic, barium, cadmium, chromium, copper, iron, lead, selenium, silver, zinc, and mercury.

Table 2 identifies the waterbodies and the sampling sites (STORET Numbers) that were used to assess beneficial use support. The waterbodies identified as ‘areas of undefined waterbodies’ were large areas containing intermittent and ephemeral streams.

Beneficial use assessments were made based upon the methodology listed in the Appendix. Water chemistry data were compared against Utah’s standards listed in ‘**Standards of Quality for Waters of the State**’, R317-2, Utah

Administrative Code, (DWQ, 1999) to determine if the beneficial use designations (Figure 2) for the different waterbodies was being supported. Waters that had elevated levels of phosphorus were identified as needing further study.

The definitions of major, moderate, and minor used in the beneficial use support tables identifying cause and source of impairments are listed below.

! Major contribution: A cause/source makes a major contribution to impairment if it is the only one responsible for *non support* of any designated use or it predominates over other causes/sources resulting in non support.

! Moderate contribution: A cause/source is the only one responsible for *partial support* of any use, predominates over other causes/sources of partial support, or is one of multiple causes/sources of non support that have a significant impact on the designated use attainment.

! Minor contribution: A cause/source is one of multiple causes/sources responsible for non support or partial support and is judged to contribute relatively little to this non attainment

Results

Beneficial Use Assessment--There are an estimated 2,551 perennial stream miles within the West Colorado Watershed Management Unit. An assessment of support of all beneficial uses except Class 2B (contact recreation) was made for 1,986 (77.9%) stream miles. Of these, 1,430 miles (72.0%) were assessed as fully supporting all their beneficial uses, 143 miles (7.2%) were assessed as partially supporting, and 413 miles (20.8%) were assessed as not supporting at least one designated beneficial use (Figure 1).

Table 3 lists the beneficial use support by

individual categories. There are an estimated 944 miles classified as Class 1C waters, source of drinking water. Six-hundred fifty (650) miles (68.9%) were assessed and all were found to be supporting this beneficial use. One-thousand nine-hundred eighty-six (1,986) stream miles were assessed for aquatic life use support. This was 77.9% of the estimated stream miles that were classified. Of these, 1,982 miles (97.4%) were assessed as fully supporting, 27 miles (1.4%) as partially supporting and 24 mile (1.2%) not supporting this beneficial use support. There were an estimated 2,377 miles of stream classified for agricultural use (Class 4). Seventy-five percent were assessed. Of these, 1,262 miles (70.4%) were assessed as fully supporting, 118 miles (6.6%) partially supporting, and 413 (23.%) not supporting this beneficial use. Overall beneficial use support (excluding Class 2B) was as follows: 1,411

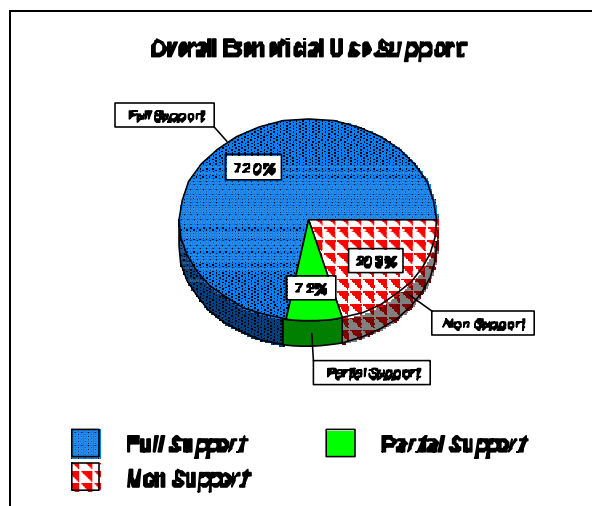


Figure 1. Overall beneficial use support excluding Class 2B waters.

miles (71.7%) were fully supporting, 143 (7.3%) partially supporting, and 413 miles (21.0%). Figure 3 identifies the waterbodies and the sampling sites used to assess each waterbody. Figure 4 shows the overall beneficial use support for the waterbody segments excluding the Class 2B category.

Those stream segments that were determined not

to be supporting at least one of their designated beneficial uses are called ‘**water quality limited segments**’ and can be placed on a list called the ‘**303(d) list of impaired waters**’. This list is submitted to EPA every two years and identifies those waters that are not meeting water quality standards or are assessed as not fully supporting one or more of their designated beneficial uses.

Table 4 lists the stream waterbodies that were assessed as impaired, the hydrological unit they are located in and the cause(s) and source(s) of impairment.

Three-hundred sixty-three (363) stream miles were assessed as needing further study for Class 3A or 3B waters due to elevated levels of phosphorus (Table 5, Figure 5).

Tables 6 and 7 lists the miles of streams affected by the various cause and source categories identified as generally affecting water quality.

The major cause of water quality impairment was total dissolved solids (Figure 6). Other factors affecting beneficial uses were metals, dissolved oxygen, pH, and iron. The relative percent impact by causes is shown in Figure 7. All percentages were calculated by combining minor, moderate, and major impacts.

The major sources of impairment were natural sources and agricultural activities. It was estimated that they affected 28.2% and 29.4% of the stream miles assessed (Figure 8). Aquaculture was identified as a source of nutrients on the Fremont River. About 1% of the sources of stream impairment were listed as unknown. The relative percent impacts by sources are shown in Figure 9.

Price River—Several segments of the Price River from its confluence to the Carbon Canal Diversion were assessed as partial supporting or non supporting their agricultural beneficial use designation. Gordon Creek, a tributary to the Price River was also found to contain high levels

to total dissolved solids. The probable sources of the total dissolved solids were natural and agricultural activities such as irrigation return flows. The lower portion of the Price River from its confluence with the Green River to Woodside was assessed as not supporting its Class 3C designation because of low dissolved oxygen and dissolved iron.

San Rafael River—The San Rafael River from the Green River to its confluence with Huntington and Cottonwood Creeks was assessed as not supporting its Class 4 (agriculture) designation because of the high levels of total dissolved solids.

Muddy River—Two segments of the Muddy River were assessed as non supporting agricultural usage because of high total dissolved solids. These two segments include the river from its confluence with the Dirty Devil River to the U-10 highway crossing. Like other streams in the West Colorado Unit, the probable sources were agricultural practices and natural.

Fremont River—The Fremont River from Bicknell to the U.S. Forest Service boundary was assessed as partially supporting its Class 3A (cold water game fish) beneficial use because of low dissolved oxygen and total phosphorus.

Other streams which had segments that exceeded the total dissolved solids criteria and were assessed as either partially or non supporting of their agricultural beneficial use were the lower portions of Huntington Creek, Cottonwood Creek, Quitchipah Creek and Ivie Creek.

Stream Beneficial Use Classifications

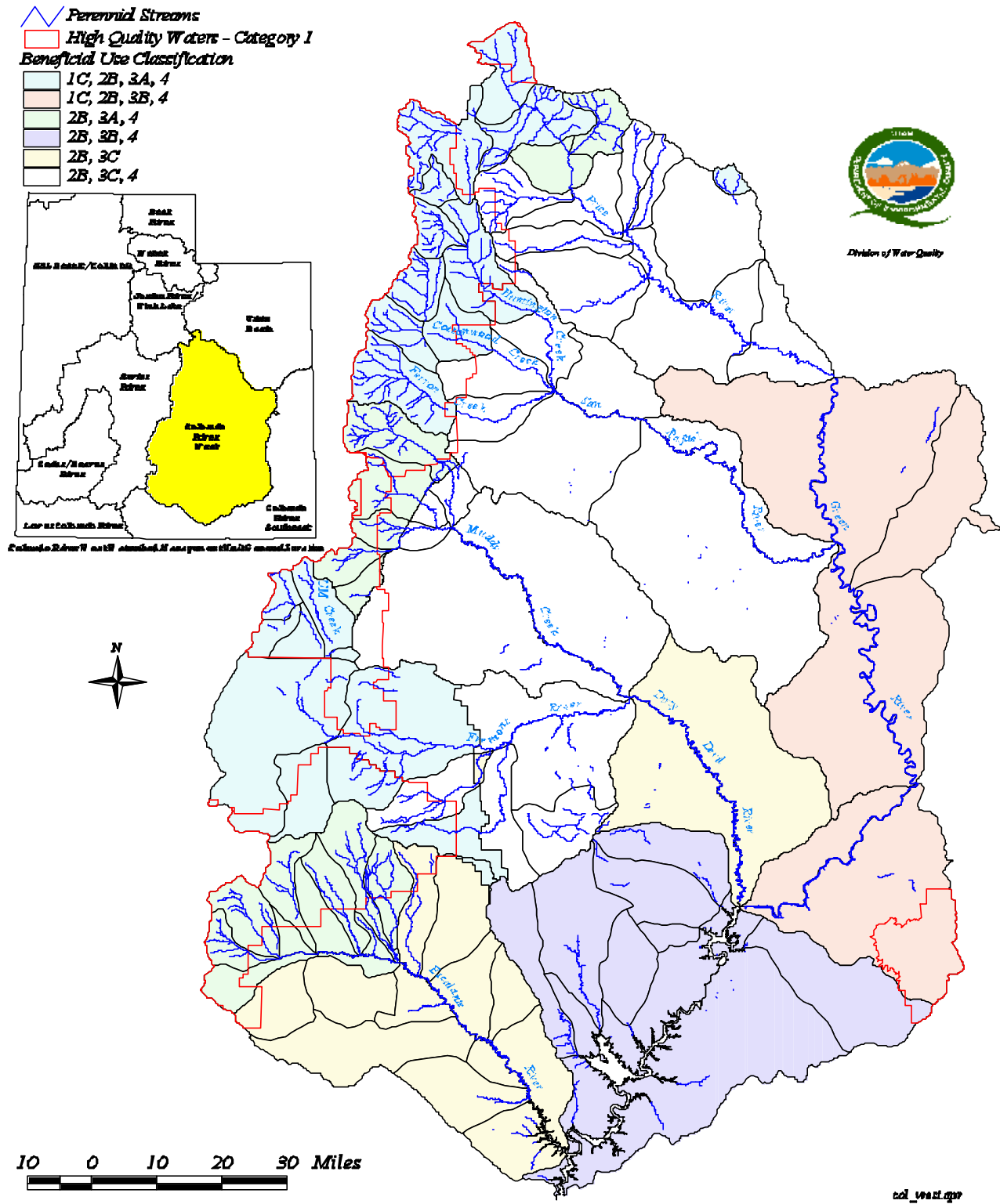


Figure 2. Stream beneficial use classifications in the Western Colorado Watershed Management Unit.

Table 2. Waterbody Numbers and Sampling Sites (STORET Number) Used to Assess Waterbodies.					
Waterbody	STORET	Waterbody	Waterbody	STORET	Waterbody
Number	Number	Name	Number	Number	Name
1	493283	White River	56		Oak Creek
1	493288	White River	57		Sandy Creek
1	493286	White River	58		Henry Mountains
2	593148	Scofield Reservoir Tribs	59	495433	Fremont River-4
2	593165	Scofield Reservoir Tribs	60	495430	Dirty Devil
3	493309 493281	Price River-1	61		Area of Undefined Waterbodies
4		Willow Creek	62		Area of Undefined Waterbodies
5	493253	Price River-2	63		Upper Valley Creek
6	493253	Gordon Creek	64	495463	Birch Creek
7	493239	Price River-3	65	495463	North Creek
8		Coal Creek	66	495459	Pine Creek
9		Soldier Creek	67		Mamie Creek
10		Miller Creek	68	495421	Sand Creek
11		Desert Seep Wash	69	495421	Calf Creek
12	493332	Lower Grassy Trail Creek	70	495408	Deer Creek
13		Upper Grassy Trail Creek	71	495410	The Gulch
14	493165	Price River-4	72		Wolverine Cr
15	493161	Price River-5	73	495424	Upper Escalante
16	493053	Huntington Creek-1	74		Escalante Tribs
17	493053	LF Huntington Creek	75		Upper Alvey Wash
18	493053	Huntington Creek-2	76		Lower Alvey wash
19	493053	Huntington creek-3	77	595274	Lower Escalante
20	493110	Lowery Water	78		Area of Undefined Waterbodies
21	493113	Joes Valley	79		Coyote Wash
22	493095	Upper Cottonwood Creek	80		Area of Undefined Waterbodies
24	593176	Upper Ferron Creek	81		Area of Undefined Waterbodies
25	493052	Lower Huntington Creek	82		Area of Undefined Waterbodies
26	493093	Lower Cottonwood Creek	83		Area of Undefined Waterbodies
27	493082 493080	Lower Ferron Creek	84		Area of Undefined Waterbodies
28	493034	Upper San Rafael	85		Halls Creek
29	493029	Lower San Rafael	86		Bullfrog Creek
30	493141	Green River-4	87		Area of Undefined Waterbodies
31		Area of Undefined Waterbodies	88		Area of Undefined Waterbodies
32		Area of Undefined Waterbodies	89		Colorado River-1
33	493001	Green River-5	90	493001	Colorado River-2
34		Area of Undefined Waterbodies	91		Area of Undefined Waterbodies
35		Area of Undefined Waterbodies	92		Area of Undefined Waterbodies
36	495543	Upper Muddy	93		North Wash
37	495543	Upper Quitchipah Creek	94		Trachyte Creek
38	495543	Saleratus Creek	95		Area of Undefined Waterbodies
39		Upper Ivie Creek	96		Area of Undefined Waterbodies
40		Last Chance Creek	97		Area of Undefined Waterbodies
41	495530	Middle Muddy	98		Area of Undefined Waterbodies
42	495530	Lower Quitchipah Creek	99		Area of Undefined Waterbodies
43	495530	Lower Ivie Creek	100		Area of Undefined Waterbodies
44	495500	Lower Muddy Creek	101		Area of Undefined Waterbodies
45		Area of Undefined Waterbodies	102		Area of Undefined Waterbodies
46		Area of Undefined Waterbodies	103		Area of Undefined Waterbodies

Table 2. Waterbody Numbers and Sampling Sites (STORET Number) Used to Assess Waterbodies.					
Waterbody	STORET	Waterbody	Waterbody	STORET	Waterbody
Number	Number	Name	Number	Number	Name
47	595615	Johnson Valley	104		Area of Undefined Waterbodies
48		UM Creek	105		Area of Undefined Waterbodies
49	595592	Lake Creek	107	495455	Fremont River-1
50	495438	Fremont River-2	108	495413	Boulder Creek
51	495483	Pleasant Creek-2	109		Area of Undefined Waterbodies
52		Pine Creek	110		Area of Undefined Waterbodies
53	495468	Donkey Creek	111	495492	Fish Lake
54	495436	Fremont River-3	112		Area of Undefined Waterbodies
54	495439	Fremont River-3	113		Area of Undefined Waterbodies
55	495454	Pleasant Creek-1	114		Area of Undefined Waterbodies

Table 3. Individual Beneficial Use Support Summary West Colorado Watershed Management Unit (Stream Miles)							
Goals ^a	Use	Size Assessed	Size Fully Supporting	Size Fully Supporting but Threatened	Size Partially Supporting	Size Not Supporting	Size Not Attainable
Protect & Enhance Ecosystems	Aquatic Life	1,986.2	1,935.0	0.0	26.7	24.5	0.0
Protect & Enhance Public Health	Fish Consumption	0.0	0.0	0.0	0.0	0.0	0.0
	Swimming ^b	0.0	0.0	0.0	0.0	0.0	0.0
	Secondary Contact	0.0	0.0	0.0	0.0	0.0	0.0
	Drinking Water ^c	649.9	649.9	0.0	0.0	0.0	0.0
Social and Economic	Agricultural	1,793.5	1,262.3	0.0	118.2	413.0	0.0

^a These goals are part of the national water quality goals adopted by the EPA Office of Water and the ITFM in their Environmental Goals and Indicators effort.

^b Class 2B (secondary contact) streams were evaluated as swimmable for purposes of the CWA goals, therefore the swimming and secondary contact classification categories are the same.

West Colorado Watershed Management Unit Waterbodies and Sampling Sites

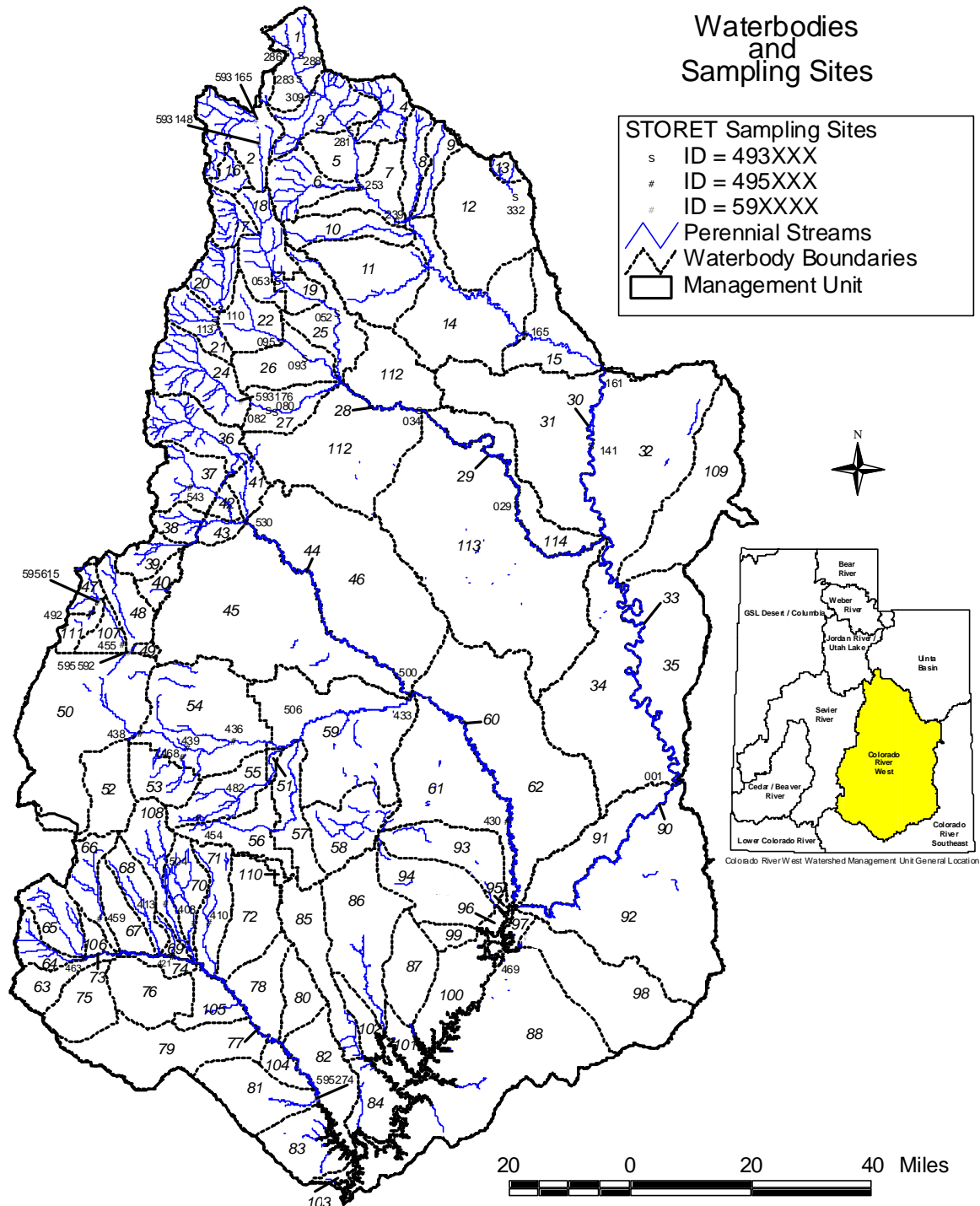


Figure 3. West Colorado Watershed Management Unit waterbodies and sampling sites.

West Colorado Stream Beneficial Use Assessment

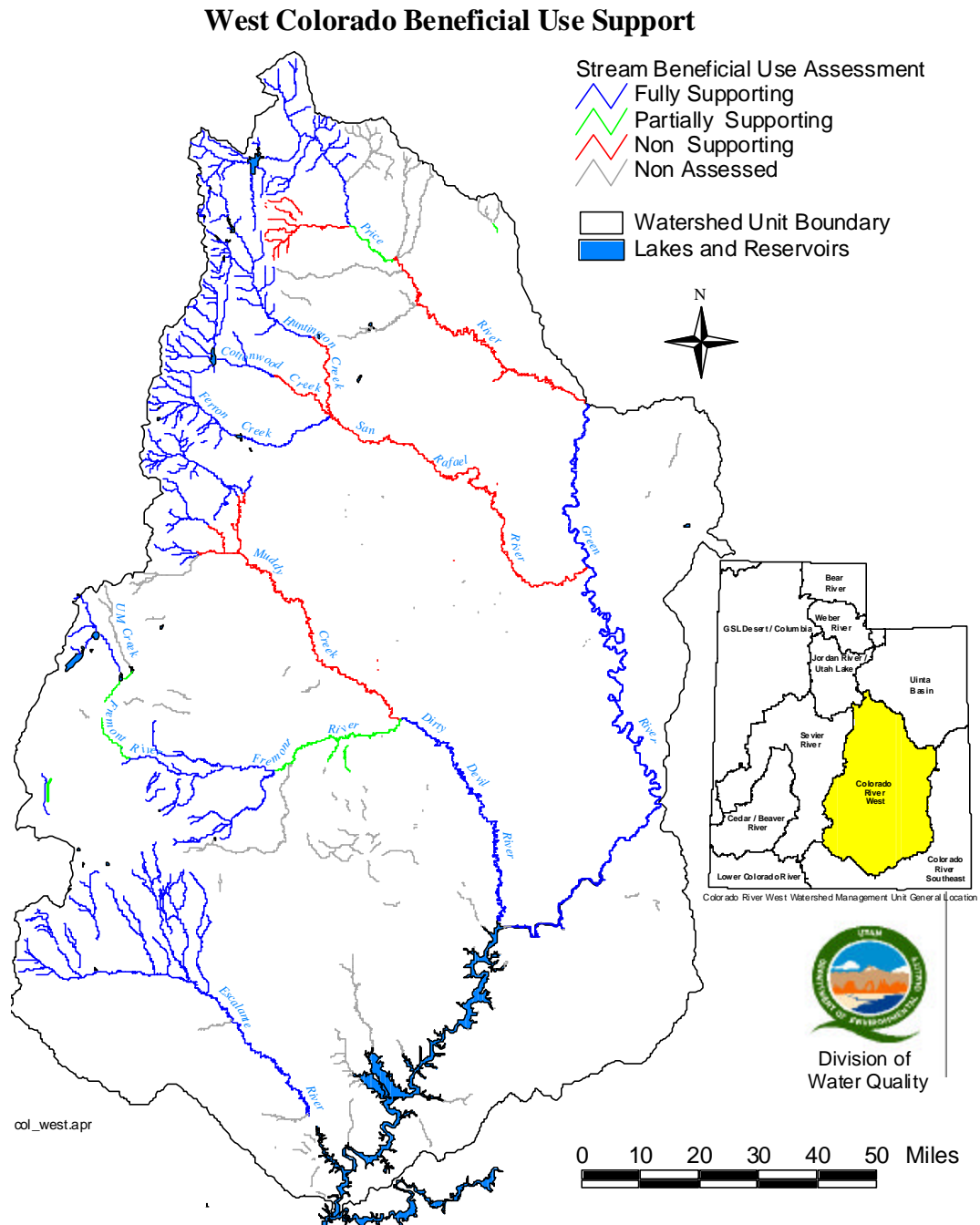


Figure 4. West Colorado Watershed Management Unit beneficial use support map.

Table 4. Water Quality Limited Segments - 303(d) List of Impaired Waters										
West Colorado Watershed Management Unit										
				Beneficial				Impact		Impact
WB	Waterbody	Waterbody		Use	Stream	Use	Probable	of	Probable	of
No.	Name	Description	HUC	Class	Miles	Support	Cause	Cause	Source	Source
6	Gordon Creek	Gordon Creek from confluence with Price River to headwaters	14060007	4	51.1	NS	Total Dissolved Solids	Major	Natural	Moderate
6	Gordon Creek	Gordon Creek from confluence with Price River to headwaters	14060007	4	51.1	NS	Total Dissolved Solids	Major	Agriculture	Moderate
7	Price River-3	Price River and tributaries from Coal Creek cntl to Carbon Canal Diversion	14060007	4	16.7	PS	Total Dissolved Solids	Moderate	Natural	Moderate
7	Price River-3	Price River and tributaries from Coal Creek cntl to Carbon Canal Diversion	14060007	4	16.7		Total Dissolved Solids	Moderate	Agriculture	Moderate
12	Lower Grassy Trail Creek	Grassy Trail Creek from Price R confluence to beneficial use classification change.	14060007	3C	1.74	PS	pH	Moderate	Unknown	Moderate
12	Lower Grassy Trail Creek	Grassy Trail Creek from Price R confluence to beneficial use classification change.	14060007	4	1.74	PS	pH	Moderate	Unknown	Moderate
14	Price River-4	Price River and Tribs from near Woodside to Soldier Creek cnfl	14060007	4	68.1	NS	Total Dissolved Solids	Major	Natural	Moderate
14	Price River-4	Price River and Tribs from near Woodside to Soldier Creek cnfl	14060007	4	68.1	NS	Total Dissolved Solids	Major	Agriculture	Moderate
15	Price River-5	Price River and tribs from cnfl w/Green River to near Woodside	14060007	3C	24.5	NS	Dissolved Oxygen	Moderate	Unknown	Moderate
15	Price River-5	Price River and tribs from cnfl w/Green River to near Woodside	14060007	3C	24.5	NS	Iron	Moderate	Agriculture	Moderate
15	Price River-5	Price River and tribs from cnfl w/Green River to near Woodside	14060007	3C	24.5	NS	Iron	Moderate	Natural	Moderate
15	Price River-5	Price River and tribs from cnfl w/Green River to near Woodside	14060007	4	24.5	NS	Total Dissolved Solids	Moderate	Natural	Moderate
15	Price River-5	Price River and tribs from cnfl w/Green River to near Woodside	14060007	4	24.5	NS	Total Dissolved Solids	Moderate	Agriculture	Moderate
25	Huntington Creek-4	Huntington Creek tribs from cnfl w/Cottonwood Creek to Highway 10 crossing	14060009	4	27	NS	Total Dissolved Solids	Major	Natural	Moderate
25	Huntington Creek-4	Huntington Creek tribs from cnfl w/Cottonwood Creek to Highway 10 crossing	14060009	4	27	NS	Total Dissolved Solids	Major	Agriculture	Moderate
26	Lower Cottonwood Creek	Cottonwood Creek from cnfl w/Huntington Creek to Highway 57	14060009	4	17.6	NS	Total Dissolved Solids	Major	Agriculture	Moderate
26	Lower Cottonwood Creek	Cottonwood Creek from cnfl w/Huntington Creek to Highway 57	14060009	4	17.6	NS	Total Dissolved Solids	Major	Natural	Moderate
28	Upper San Rafael	San Rafael River from Buckhorn Crossing to confluence Huntington and Cottonwood Creeks	14060009	4	22.4	NS	Total Dissolved Solids	Major	Agriculture	Moderate
28	Upper San Rafael	San Rafael River from Buckhorn Crossing to confluence Huntington and Cottonwood Creeks	14060009	4	22.4	NS	Total Dissolved Solids	Major	Natural	Moderate
29	Lower San Rafael	San Rafael River form cnfl w/Green River to Buckhorn Crossing	14060009	4	82.4	NS	Total Dissolved Solids	Major	Agriculture	Moderate

Table 4. Water Quality Limited Segments - 303(d) List of Impaired Waters										
West Colorado Watershed Management Unit										
				Beneficial				Impact		Impact
WB	Waterbody	Waterbody		Use	Stream	Use	Probable	of	Probable	of
No.	Name	Description	HUC	Class	Miles	Support	Cause	Cause	Source	Source
29	Lower San Rafael	San Rafael River form cnfl w/Green River to Buckhorn Crossing	14060009	4	82.4	NS	Total Dissolved Solids	Major	Natural	Moderate
41	Middle Muddy	Muddy Cr. and tribs from Quitchipah Cr. cnfl to U-10xing	14070002	4	20.6	NS	Total Dissolved Solids	Major	Agriculture	Moderate
41	Middle Muddy	Muddy Cr. and tribs from Quitchipah Cr. cnfl to U-10xing	14070002	4	20.6	NS	Total Dissolved Solids	Major	Natural	Moderate
42	Lower Quitchipah Creek	Quitchipah Cr. from cnfl of Ivie Cr. to U-10 xing	14070002	4	9.33	NS	Total Dissolved Solids	Major	Agriculture	Moderate
42	Lower Quitchipah Creek	Quitchipah Cr. from cnfl of Ivie Cr. to U-10 xing	14070002	4	9.33	NS	Total Dissolved Solids	Major	Natural	Moderate
43	Lower Ivie Creek	Ivie Creek and tribs from cnfl w/Muddy R. to U-10 highway	14070002	4	14.1	NS	Total Dissolved Solids	Major	Agriculture	Moderate
43	Lower Ivie Creek	Ivie Creek and tribs from cnfl w/Muddy R. to U-10 highway	14070002	4	14.1	NS	Total Dissolved Solids	Major	Natural	Moderate
44	Lower Muddy Creek	Muddy Creek from cnfl w/Fremont River to Quitchipah Creek cnfl	14070002	4	75.9	NS	Total Dissolved Solids	Major	Agriculture	Moderate
44	Lower Muddy Creek	Muddy Creek from cnfl w/Fremont River to Quitchipah Creek cnfl	14070002	4					Natural	Moderate
49	Lower Um Creek	UM Creek from Mill Meadow to Forsythe Reservoir	14070003	3A	0.81	PS	Dissolved Oxygen	Moderate	Unknown	Moderate
50	Fremont River-2	Fremont River near Bicknell to U.S. FS boundary	14070003	3A	24.1	PS	Dissolved Oxygen	Moderate	Unknown	Moderate
50	Fremont River-2	Fremont River near Bicknell to U.S. FS boundary	14070003	3A	24.1	PS	Total Phosphorus	Moderate	Agriculture	Moderate
50	Fremont River-2	Fremont River near Bicknell to U.S. FS boundary	14070003	3A	24.1	PS	Total Phosphorus	Moderate	Aquaculture	Moderate
59	Fremont River-4	Fremont R. & tribs from cnfl w/Dirty Devil to east boundary	14070003	4	99.8	PS	Total Dissolved Solids	Moderate	Agriculture	Moderate
59	Fremont River-4	Fremont R. & tribs from cnfl w/Dirty Devil to east boundary	14070003	4	99.8	PS	Total Dissolved Solids	Moderate	Natural	Moderate

West Colorado Watershed Management Unit Elevated Phosphorus

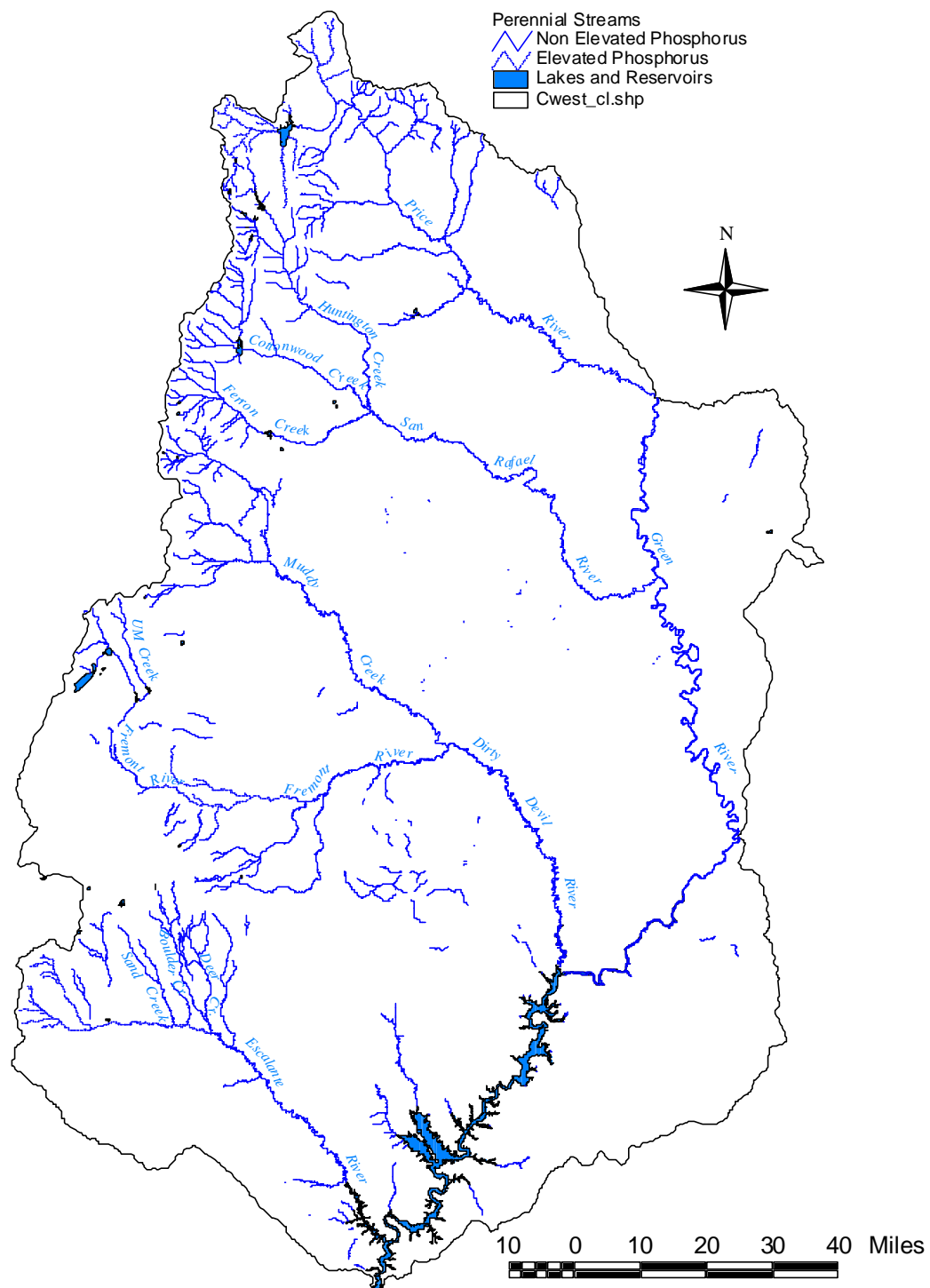


Figure 5. Stream segments in the West Colorado Watershed Management Unit with elevated levels of total phosphorus.

Table 5. Waterbodies With Elevated Levels of Total Phosphorus.

Polygon	Waterbody	Waterbody		Stream
No.	Name	Description	HUC	Miles
1	White River	White R. from confluence w/Price R. to Headwaters	14060007	36.04
2	Scofield Reservoir Tribs	Tributaries to Scofield Reservoir	14060007	76.48
59	Fremont River-4	Freemont R. & tribs from cnfl w/Dirty Devil to east boundary of Capitol Reef NP	14070003	99.82
64	Birch Creek	Birch Creek & tribs from cnfl w/Escalante R. to headwaters	14070005	27.69
65	North Creek	North Creek from cnfl w/Escalante R. to headwaters	14070005	38.74
70	Deer Creek	Deer Creek & trib from cnfl w/Escalante River to headwaters	14070005	57.02
73	Upper Escalante	Escalante R. and some tribs from Boulder Creek cnfl to Birch Creek confluence	14070005	26.86

Table 6. Total Waters Impaired by Various Cause Categories - West Colorado Watershed Management Unit Streams. (Stream Miles)		
Cause Category	Contribution to Impairments	
	Major	Moderate/Minor
Cause unknown	0.0	0.0
Unknown toxicity	0.0	0.0
Pesticides	-	-
Priority organics	-	-
Nonpriority organics	-	-
Metals	0.0	24.5
Ammonia	0.0	0.0
Chlorine	0.0	0.0
Other inorganics	0.0	0.0
Nutrients	0.0	24.1
pH	0.0	1.7
Siltation/Sediments	0.0	162.4
Organic enrichment/low DO	0.0	49.5
Salinity/TDS/Chlorides	388.5	141.0
Thermal modifications	0.0	0.0
Flow alterations	0.0	0.0
Other habitat alterations	0.0	0.0
Pathogen Indicators	-	-
Radiation	-	-
Oil and grease	-	-
Taste and odor	0.0	0.0
Noxious aquatic plants	0.0	0.0
Total toxics	-	-
Turbidity	-	-
Exotic Species	-	-

Table 7. Total Waters Impaired by Various Source Categories - West Colorado Watershed Management Unit Streams (Stream Miles)		
Source Category	Contribution to Impairments	
	Major	Moderate/Minor
Industrial Point Sources	0.0	0.0
Municipal Point Sources	0.0	68.3
Combined Sewer Overflow	0.0	0.0
Agriculture	0.0	578.1
Silviculture	-	-
Construction	-	0.0
Urban Runoff/Storm Sewers		
Resource Extraction	0.0	0.0
Land Disposal	-	0.0
Hydromodification	0.0	0.0
Habitat Modification	0.0	0.0
Marinas	*	*
Atmospheric Deposition	-	-
Contaminated Sediments	-	-
Unkown Source	0.0	51.2
Natural Sources	0.0	554.0
Reservoir Releases	0.0	0.0
Recreation	0.0	0.0
Aquaculture	0.0	24.1

* = Category not applicable.

- = Category applicable, no data available.

0 = Category applicable, but size of waters in the category is zero.

Note: **Major** category is now used only for waters found not supporting.

* = Category not applicable.

- = Category applicable, no data available.

0 = Category applicable, but size of waters in the category is zero. Note: **Major** category is now used only for waters found not supporting.

Percent of Stream Miles Affected By Causes ***West Colorado Watershed Management Unit***

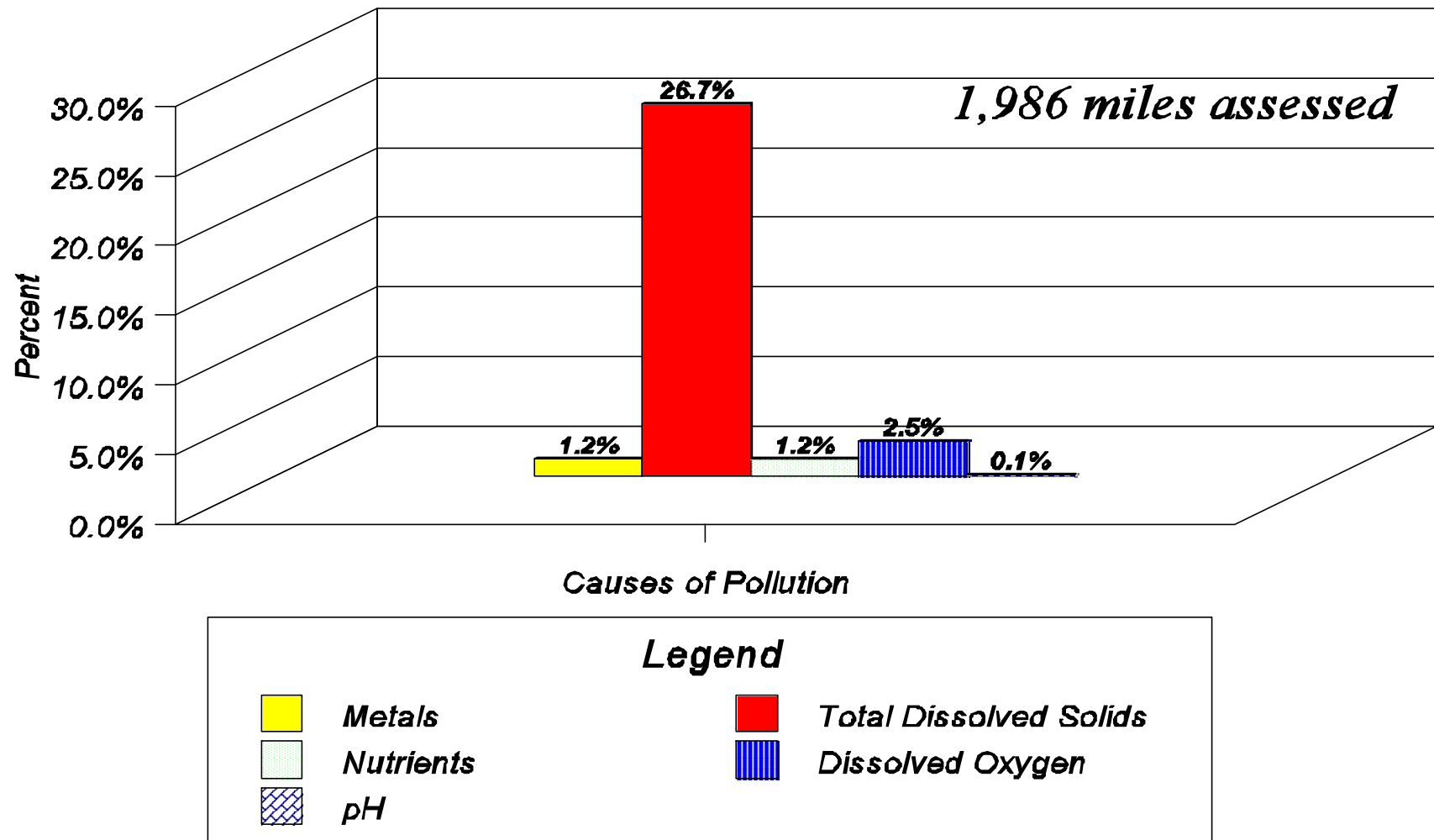


Figure 6. Percent of assessed stream miles impacted by various causes.

Causes of Stream Water Quality Impairments

West Colorado Watershed Management Unit

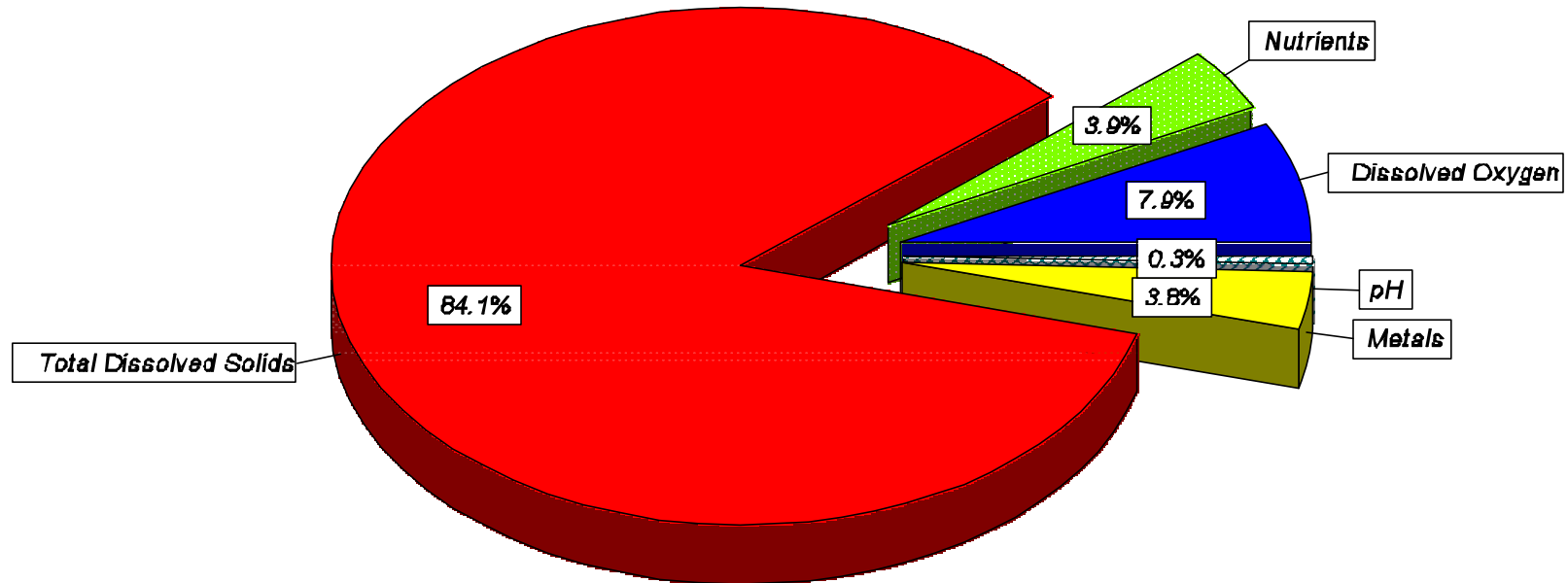


Figure 7. Relative percent impact by causes on water quality.

Percent of Stream Miles Affected By Sources West Colorado Watershed Management Unit

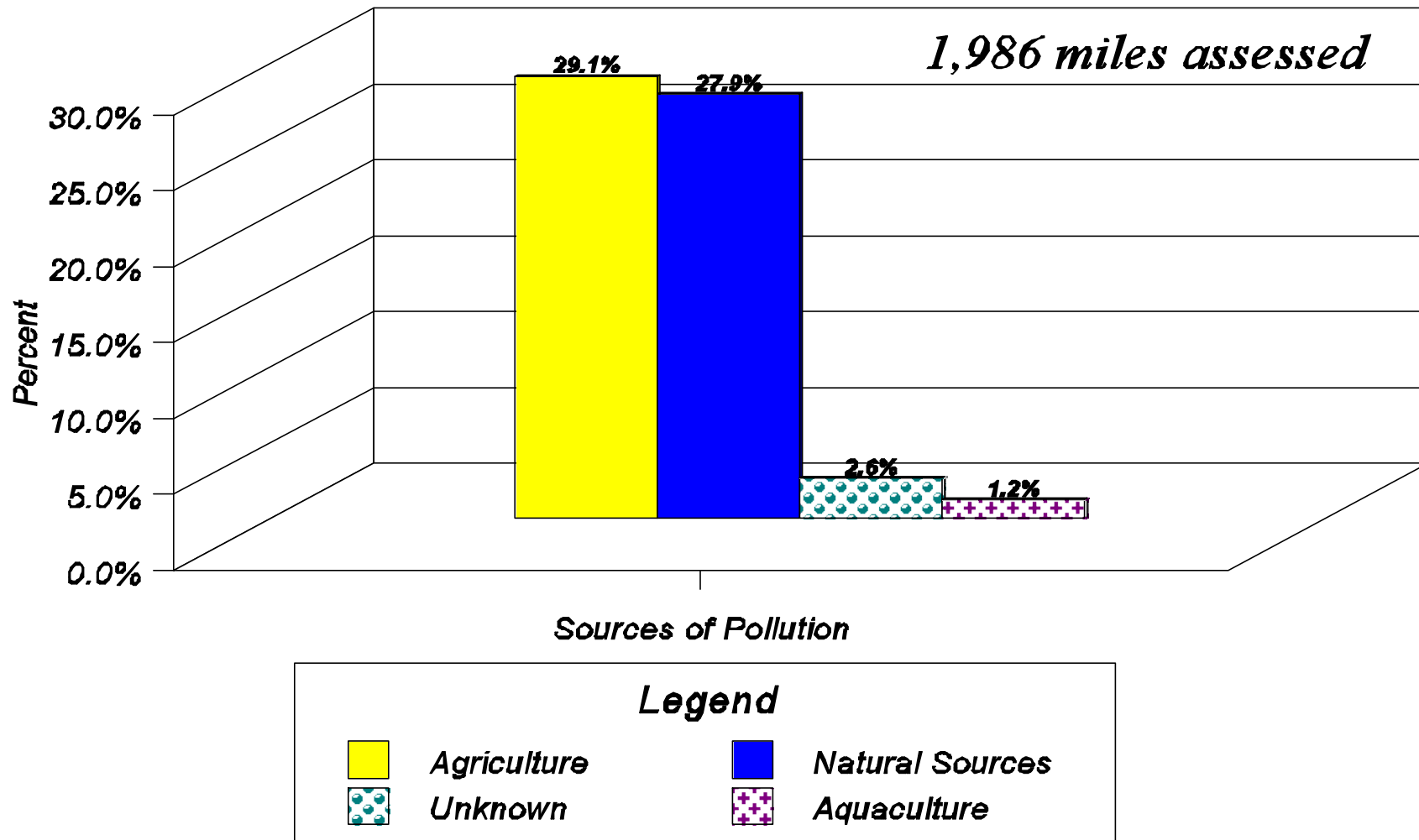


Figure 8. Percent of assessed stream miles affected by various sources.

Sources of Stream Water Quality Impairment 2000 305(b)

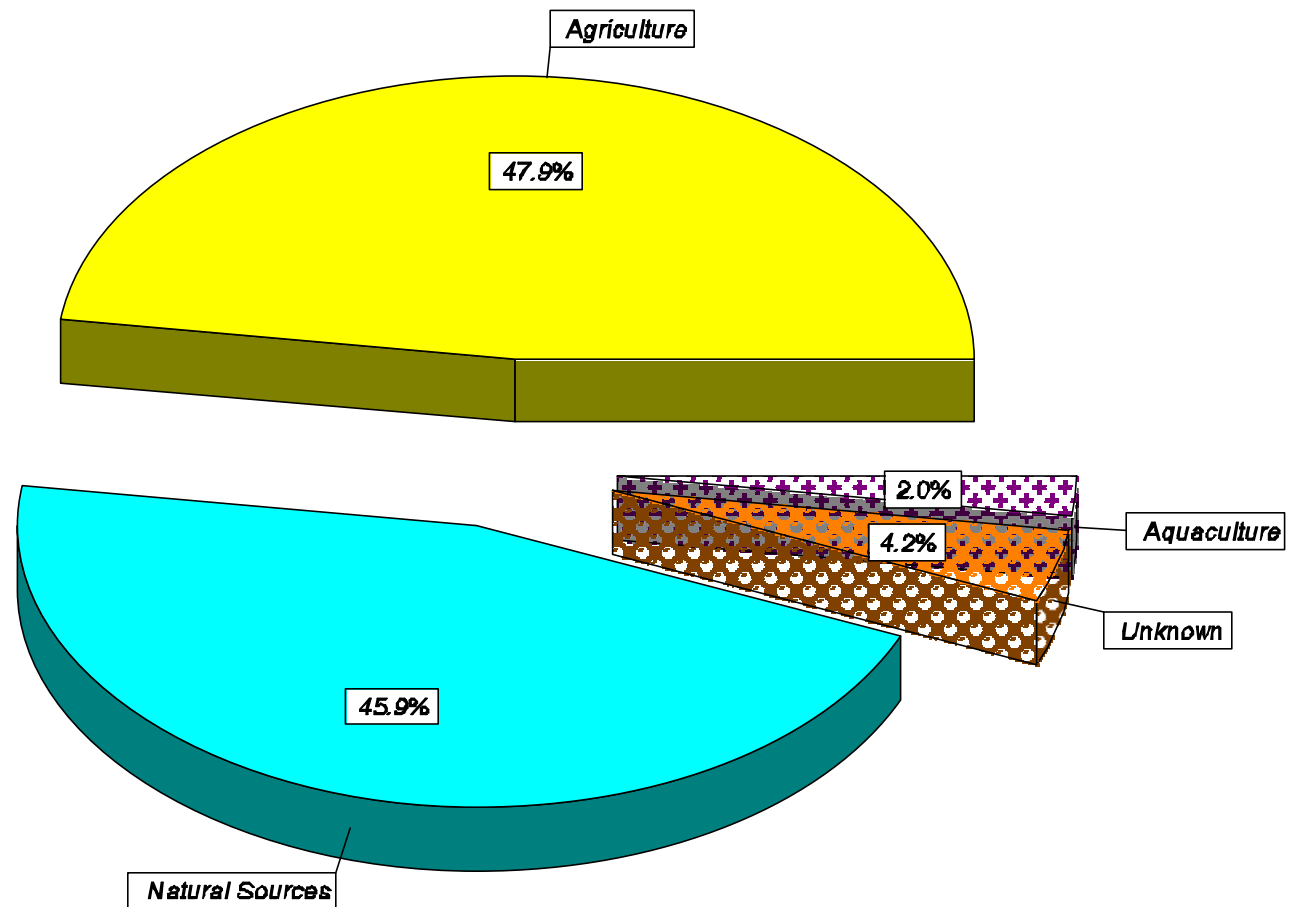


Figure 9. Relative percent impact by sources on stream water quality.

REFERENCES

Division of Water Quality. 1999. Standards of quality for waters of the State, R317-2, Utah Administrative Code, Utah Division of Water Quality, Utah Department of Environmental quality, Salt Lake City, UT.

Division of Water Quality. 1993. Quality assurance and standard operating procedures manual. Utah Division of Water Quality, Utah Department of Environmental quality, Salt Lake City, UT.

APPENDIX

Methods for Determining Beneficial Use Support

Tables 1 through 4 are the criteria used to compare data against standards and pollution indicators found in *Standards of Quality for Waters of the State, R317-2, Utah Administrative Code* to determine beneficial use support of waterbodies. The State of Utah exercises discretion in using data on that goes beyond the criteria listed in the following tables and/or narrative for determining beneficial use support and can include other types of information and best professional judgement.

Table A-1. Criteria for Assessing Water as a Source of Drinking Water-Class 1C

Degree of Use Support	Field Monitoring (Toxicants)	Restrictions
Full	For any one pollutant, no more than one violation of criterion.	No source water closures or advisories
Partial	For any one pollutant, two or more violations of the criterion, but violations occurred in #10% of the samples.	One or more drinking water source advisories lasting less than 30 days per year.
Non	For any one pollutant, two or more violations of the criterion, and violations occurred in more than 10% of the samples.	One or more drinking water source advisories lasting greater than 30 days.

Table A-2. Criteria for Assessing Primary and Secondary Contact Beneficial Use - Class 2A and 2B

Degree of Use Support	Restrictions	Fecal Coliform Bacteria
Full	No bathing area closures or restrictions in effect during reporting period.	Criterion 1 and Criterion 2 met.
Partial	On average, one bathing area closure per year of less than one week's duration.	Geometric mean met; not more than 25 percent of samples exceed 400 per 100 ml.
Non	On average, one bathing area closure per year of greater than one week's duration, or more than one bathing area closure per year.	Neither geometric mean nor maximum criteria limits achieved.

Bacterial Criterion

Criterion 1 = The geometric mean of the fecal coliform bacteria level should not exceed 200 per 100 mL for any 30-day period.

Criterion 2 = Not more than 10 percent of the total samples taken during any 30 day period should have a density that exceeds 400 per 100 mL.

Table A-3. Criteria for Assessing Aquatic Life Beneficial Support-Classes 3A, 3B, 3C, 3D

Degree of Use Support	Conventional Parameters (pH, DO, Temperature)	Toxic Parameters (priority pollutants, chlorine, and ammonia)
Full	For any one pollutant, no more than one exceedance of criterion or criterion was not exceeded in < 10% of the samples if there were two or more exceedances.	For any one pollutant, no more than one violation of acute criteria.
Partial	For any one pollutant, criterion was exceeded two times, and criterion was exceeded in more than 10% but not more than 25% of the samples.	For any one pollutant, two or more violations of the acute criterion, but violations occurred in #10% of the samples.
Non	For any one pollutant, criterion was exceeded two times, and criterion was exceeded in more than 25% of the samples.	For any one pollutant, two or more violations of the acute criterion, and violations occurred in more than 10% of the samples.

Total Phosphorus Assessment

For **total phosphorus** , the following criteria were used to identify waters as ‘**needing further evaluation**’.

If the **pollution indicator value** for total phosphorus (**0.05 mg/L**) was exceeded in more than 10% of the samples, and the mean of all samples was > **0.06 mg/L** the waterbody was identified as ‘needing further evaluation or study’ before a decision to list a stream waterbody on the 303(d) list. Additional evaluations could include benthic macroinvertebrate data, diurnal dissolved oxygen data, habitat quality evaluations, and fisheries data. Reports published or information collected by other entities can be used to determine beneficial use support.

Table A-4. Criteria for Assessing Agricultural Beneficial Use Support - Class 4

Degree of Use Support	Conventional Parameter (Total Dissolved Solids)	Toxic Parameters
Full	Criterion exceeded in less than two samples and in < 10% of the samples if there were two or more exceedances.	For any one pollutant, no more than one violation of criterion.
Partial	Criterion was exceeded two times, and criterion was exceeded in more than 10% but not more than 25% of the samples.	For any one pollutant, two or more violations of the criterion, but violations occurred in #10% of the samples.
Non	Criterion was exceeded two times, and criterion was exceeded in more than 25% of the samples.	For any one pollutant, two or more violations of the criterion, and violations occurred in more than 10% of the samples.